Community Energy Plan Update

Hamlet of Aklavik 2017

Natural Resources Canada
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Canada

HAMLET OF AKLAVIK
NEVER SAY DIE

ARCTIC ENERGY ALLIANCE

Introduction and Acknowledgements

This Updated Community Energy Plan explains what we did so far during the energy planning process, and outlines a work plan for what we need to do next.

We thank the following people who helped create this community energy plan for Aklavik:

- Community members, representatives from the Aklavik Community Corporation, and Hamlet Councillors, who took the time and energy to participate
- Staff at the Hamlet of Aklavik office
- NRCan for providing funding for this project
- The Arctic Energy Alliance who facilitated the process

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Executive Summary

Background:

Council representatives and community members worked with the Arctic Energy Alliance (AEA) to review and update the Community Energy Plan (CEP) so that it reflects the local energy sources, current energy needs and the principles of sustainable living and respect for the land that are held by residents of Aklavik.

The initial CEP groundwork was incorporated into the Integrated Community Sustainability Plan (ICSP) process in 2009. Community representatives, AEA and the Pembina Institute participated in the regional ICSP meeting that resulted in the 2009 Community Energy Plan (CEP).

The CEP review process was initiated in January 2017. The review had two (2) objectives:

- Identify the accomplishments the community had achieved from the 2009 CEP; and
- Determine future directions.

The updated CEP was accepted by the Hamlet Council on March 14, 2017. The CEP process will continue after March 31, 2017 to further develop and implement the goals and strategies that were identified in the updated CEP.

An analysis was completed for each goal and strategy to determine potential reductions in fuel use, greenhouse gas emissions, and payback.

Measuring greenhouse gas emissions is going to become very important when a carbon tax is introduced. The NWT has not determined how it will implement its carbon taxing but the default

for Canada is $10/tonne starting in 2018, rising by C$10 a year until it reaches C$50 in 2022.

NRCan provided funding to make the review of the Aklavik CEP possible, and has also committed to providing some funding in the 2017/18 fiscal year to help support the implementation of some of the strategies.

Community Energy Planning Vision:

The Community Energy Planning Vision reflects the values of the community. The Vision Statement was reviewed as part of the 2017 CEP review and was found to be still relevant. No changes were suggested.

- The Hamlet of Aklavik will ensure that the residents of Aklavik have the information they need to make wise choices about their energy use;
- Our community will use energy and water in harmony with the land; and
- Clean, affordable and reliable energy are the everyday norm.

Strategies to Achieve the Updated Community Energy Plan:

1. **Complete a series of energy efficiency audits and retrofits for non-residential buildings in Aklavik** (Original CEP strategy).

2. **Complete a series of homeowner energy evaluation and retrofits** (New strategy).

3. **Provide winterization and home maintenance workshops** (including training for students and help for elders) (New strategy).

4. **Switch all washers and fridges to Energy Star and switch all lights to LED in homes** (New strategy).

5. **Install wood stoves in homes** (New strategy).

6. **Provide solar or solar/wind hybrid systems for bush camps** (New strategy).

7. **Increase local food availability and knowledge** (New strategy).

Points to integrate as much as possible into all strategies

1. **Educational component** – encourage involvement and participation from students at Moose Kerr School (2009 CEP strategy).

2. **Incorporate skills and economic development opportunities** – training in clean energy technology (2009 CEP strategy).

Potential Future Strategies

1. **Include energy use considerations in all community planning exercises** (2009 CEP strategy).

2. **Implement an energy efficient building standard for new homes** (2009 CEP strategy).

3. **Implement an energy efficient building standard for new non-residential buildings** (2009 CEP strategy).

4. **Work with stores to improve the selection of Energy Star appliances and LED lights available to community residents** (New strategy).

5. **Conduct a wood pellet/chip boiler feasibility study** (New strategy, but based on "Exploration of alternative energy development (wind, solar, hydro electricity)" from 2009 CEP strategy)

6. **Conduct a wind potential study** (New strategy, but based on "Exploration of alternative energy development (wind, solar, hydro electricity)" from 2009 CEP strategy)

7. **Conduct a micro-hydro potential study** (New strategy, but based on "Exploration of alternative energy development (wind, solar, hydro electricity)" from 2009 CEP strategy)

Strategies from 2009 CEP that were achieved or not feasible

1. **Waste heat capture from the diesel generating facility**
2. **Install solar water heaters on one or more community buildings**
3. **Use of alternative energy for buildings**

Introduction

Aklavik is located on the west side of the Mackenzie Delta and is accessible by ice road during the winter and by air and boat during the rest of the year.

Most buildings are heated primarily with heating oil, although some use cord wood.

Aklavik relies on a diesel generator plant for electricity and has 26 kW of solar PV installed throughout the community. A planned 55 kW install in March 2017, will mean Aklavik has used its available capacity for microgeneration connected to the electrical grid. Without discussions to change the allowable capacity for microgeneration, it will not be impossible to install any additional microgeneration tied to the local grid.

In 2009 the Hamlet of Aklavik worked with AEA and the Pembina Institute and formed a Community Energy Committee to guide the CEP process at that time.

The CEP was reviewed and updated this year (January 2017 to March 2017), facilitated by the Arctic Energy Alliance and it is expected that this review and planning process will continue to further develop and implement the goals and strategies in the CEP.

Input into the review and update of the CEP included meeting with the councils (Hamlet council, Aklavik Community Corporation, HTCN), all the classes at the school, Elders, and the public. It also included a survey in which community members participated.

What is a Community Energy Plan?

An energy plan shows what a community decides to do, over a certain period of time, to change how energy is used – to find better ways to make and use energy.

This Community Energy Plan (CEP) report explains the energy planning process up till now, describes how energy is currently used, and outlines strategies for next steps.

The community of Aklavik developed and adopted a Community Energy Plan in 2009.

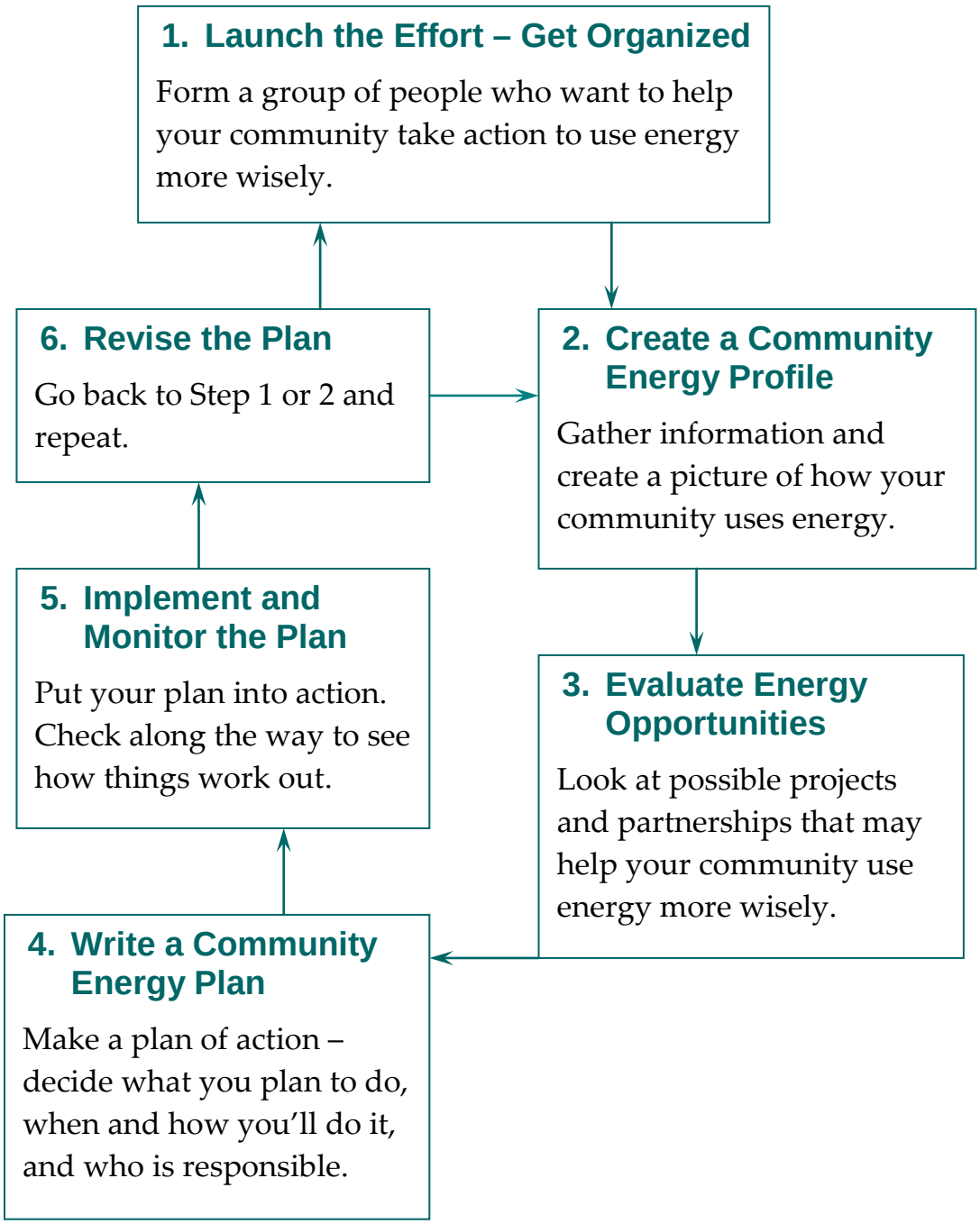
Energy planning is a cycle. The cycle might last for one, three, or five years. During each cycle, the community develops and carries out certain projects that make up the energy plan for that time period.

At the end of the time period, a community reviews the energy plan, decides what other projects they can do, and continues to work towards their vision of a healthier, cleaner energy future.

In 2017, Aklavik had the opportunity to do exactly this - review and update their CEP.

The diagram shown on the next page is a 6-step Community Energy Planning process a community can use to develop an energy plan. This updated CEP is the result of the completion of Step 6 in the planning process.

6 Steps - Energy Planning Process



Our community's Energy Vision

A vision statement describes what the community wants for the future- the end result. A vision statement helps the Hamlet and the Community Energy Committee (CEC) remember what they're working towards and what they care about. The original CEC were asked to outline what a vision for Aklavik would include.

In December, 2009, the following vision statement was approved by the CEC.

Our Energy Vision

- The Hamlet of Aklavik will ensure that the residents of Aklavik have the information they need to make wise choices about their energy use.
- Our community will use energy and water in harmony with the land.
- Clean, affordable and reliable energy are the everyday norm.

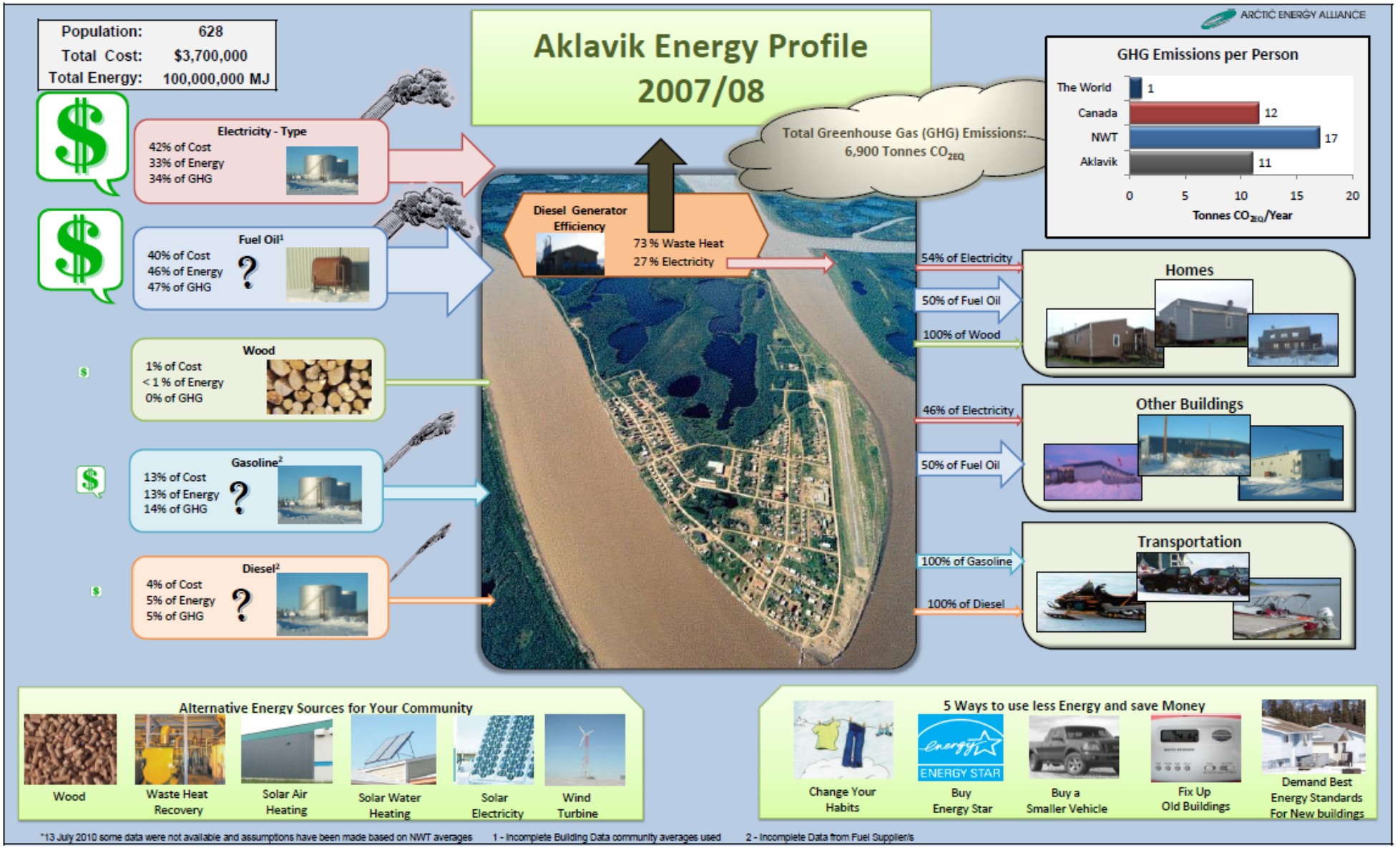
The vision was reviewed during the discussions of the updated plan in February/March 2017 and no changes were suggested from the initial vision.

Our community's energy profile

This section of the community energy plan gives a visual summary of our community energy profile.

Attempts were made to make a community energy profile for this CEP update process using 2014/15 data. Unfortunately this was not possible for Aklavik because the data is not available to the public at this time.

The community of Aklavik could work with their fuel supplier to try and get the fuel data in order to get the most up to date and accurate community energy use.


ARCTIC ENERGY ALLIANCE
Population: 628
Total Cost: $3,700,000
Total Energy: 100,000,000 MJ
Aklavik Energy Profile
2007/08
Total Greenhouse Gas (GHG) Emissions:
6,900 Tonnes CO_{2EQ}
GHG Emissions per Person
The World 1
Canada 12
NWT 17
Aklavik 11
0 5 10 15 20
Tonnes CO_{2EQ}/Year
Electricity - Type
42% of Cost
33% of Energy
34% of GHG
Fuel Oil[1]
40% of Cost
46% of Energy
47% of GHG
Wood
1% of Cost
< 1 % of Energy
0% of GHG
Gasoline[2]
13% of Cost
13% of Energy
14% of GHG
Diesel[2]
4% of Cost
5% of Energy
5% of GHG
Diesel Generator Efficiency
73 % Waste Heat
27 % Electricity
54% of Electricity
50% of Fuel Oil
100% of Wood
Homes
46% of Electricity
50% of Fuel Oil
Other Buildings
100% of Gasoline
100% of Diesel
Transportation
Alternative Energy Sources for Your Community
Wood
Waste Heat Recovery
Solar Air Heating
Solar Water Heating
Solar Electricity
Wind Turbine
5 Ways to use less Energy and save Money
Change Your Habits
Buy Energy Star
Buy a Smaller Vehicle
Fix Up Old Buildings
Demand Best Energy Standards For New buildings
*13 July 2010 some data were not available and assumptions have been made based on NWT averages
1 - Incomplete Building Data community averages used
2 - Incomplete Data from Fuel Suppliers

How does an energy profile measure energy?

The community energy profile measures energy with units called mega joules or MJ and giga joules or GJ.

- One MJ equals the amount of energy it takes to boil 2 ½ litres of water.
- 1000 MJ = 1 GJ

To create an energy profile, we convert all units of energy into MJ so we can add up all the sources of energy and compare them. Other examples of units of energy supply include things such as litres for gasoline or diesel, cords for firewood, and kilowatt hours for electricity.

How does an energy profile measure greenhouse gases?

The community energy profile measures greenhouse gas emissions as carbon dioxide equivalent ($CO_{2\ EQ}$). Carbon dioxide is the most common greenhouse gas and we use it to show overall greenhouse gas emissions. Each fuel has a standard formula to calculate greenhouse gases as $CO_{2\ EQ}$. We use this formula to calculate greenhouse gases for each fuel or energy.

The energy profile shows that wood has no greenhouse gas emissions. We count no greenhouse gases from wood because trees absorb carbon dioxide when they grow. This balances the greenhouse gases that wood produces when it burns.

Measuring greenhouse gas emissions is going to become very important when a carbon tax is introduced. The NWT has not determined how it will implement its carbon taxing but the default for Canada is $10/tonne starting in 2018, rising by C$10 a year until it reaches C$50 in 2022.

Aklavik CEP survey

This section of the community energy plan gives a summary of the results of a CEP survey conducted in Aklavik in the weeks leading up to the CEP input meetings. The surveys were also conducted in the school with grades 6 – 12 and at the meeting with the Elders.

The detailed responses can be found in the Appendix.

What are the highlights from the survey?

The questions and some of the common themes from the survey are listed below:

What do you currently do to conserve energy?

- Unplug things / shut off lights / (unplugging appliances was the most often stated response)
- Lower thermostat when not in house

What would you like to see the community do to reduce energy costs?

- Conservation / Efficiency
- Install renewable energy
- Support / Incentives
- Education
- Local food

What could your role be in energy conservation/efficiency while respecting your traditional values?

- Conserve
- Educate people
    - Teach children while they are young not to waste anything and be more energy wise
    - Help with seeds and soil education
    - Storytelling from elders to youth
    - Coordinate a youth energy contest

- Alternative Energy
- Efficiency
- Maintain environmental stewardship ideals
- Local food

Do you have energy star appliances and/or LED lights?

Yes – 30

Would you attend any sessions or meetings that offered more information on energy conservation or efficiency?

- Yes if I have time/not working – 15
- Yes – 11
- No - 6

Our community's CEP meetings

The CEP meetings held in Aklavik during February/March 2017 were the primary means by which input into the plan was discussed and collected. A summary of the strategies discussed can be found in the Appendix.

What were the meetings?

Council meeting

- A meeting in which members from the Hamlet Council, the Aklavik Community Corporation, the HTCN to explain the CEP review process and get input. The Aklavik Indian Band was invited but unfortunately had another meeting at the same time.
- Reviewed vision
- Presented results from survey and schedule of meetings and visits planned to review and update the CEP
- Collected information on what had been done from the previous plan and ideas for a revised plan
- Discussed next steps for getting the revised CEP completed and for selecting projects for NRCan funding for the 2017/18 fiscal year

Public meeting

- The public were invited to drop in to find out more about the CEP process and discuss energy issues and problems
- Reviewed vision
- Collected information on what had been done from the previous plan and ideas for a revised plan
- Presented results from survey and input provided to date to update the lan

School Visits

- Visited each classroom at the school
- Discussed energy in Aklavik and what their role could be
- Engaged in energy activities- drawings, games, role play, or discussions with each of the classrooms

- Completed survey with grades 6 -12
- Collected information on what had been done from the previous plan and ideas for a revised plan

Elders Meeting

- The elders were invited to drop in to find out more about the CEP process and discuss energy issues and problems
- Reviewed vision
- Completed survey with elders present

Our community's energy plan

This section of the community energy plan lists the strategies recommended during the meetings and discussions to review and update the CEP in Aklavik in 2017.

These strategies are based on four sources:

- Participation from community members and Councils in February/March 2017 CEP meetings;
- The community's CEP survey in Winter 2017;
- Information about Aklavik energy use in the Community Energy Profile; and
- Participation in the Community Energy Plan during the ICSP process in 2009/early 2010.

The strategies are grouped under:

- Recommended strategies (doable in the next little while)
- Potential future strategies (for future consideration)

A list of potential future strategies is also included. These involve either additional research, changes to policy or were less discussed by community members.

The first step in the process was to review the 2009 CEP Vision and strategies. These questions were asked:

- Have we accomplished any of these strategies;
- Are these strategies still relevant; and
- Is there anything we'd like to add to these strategies?

Some new strategies were added to the plan, some were retained and some were removed.

Updated List of Recommended Strategies in our Community Energy Plan

1. **Complete a series of energy efficiency audits and retrofits for non-residential buildings in Aklavik** (2009 CEP strategy)**.**

Monitoring energy use and determining how much energy the building uses for heating, lighting, and water can be used to screen buildings for energy upgrades. Upgrading existing buildings makes sense where the cost of upgrading is less than the cost of replacing a structure.

The next step is to estimate the savings, costs of upgrades and materials for each building. This type of information is typically provided in an energy audit report. The building upgrades will require final cost estimates based on the quotes from contractors and suppliers. The final step is to complete the upgrades and to monitor energy use post-retrofit.

2. **Complete a series of homeowner energy evaluation and retrofits** (New strategy).

A home energy evaluation provides an assessment of an existing home's energy efficiency through heat loss calculations, heating appliance assessment and a blower door test. This evaluation is undertaken according to the standards of Natural Resources Canada's EnerGuide Rating System. The evaluation includes a report which outlines potential energy efficiency upgrades and their estimated savings, and funding potential.

Based on AEA's experience, many homeowners likely do not have the cash or borrowing power to take advantage of the ERS program and follow up on recommendations; and, if they do have the money, lack the capacity to find and retain a contactor to undertake the work. This project could include follow-up work organized together as one project and funding could alleviate the barriers by homeowners.

Some examples of a work scope for energy efficiency upgrades could be replace wood stoves, replace electric water heaters with fuel fired water heaters, install low-flush toilets, replace weatherstripping, install LED light bulbs, replace refrigerators and washers with Energy Star refrigerators, install combustion air if needed.

3. **Provide winterization and home maintenance workshops (including training for students and help for Elders)** (New strategy)**.**

The goal of a Winterization Workshop is to provide basic knowledge and skills to winterize a house – weather stripping, stopping leaks, covering windows with plastic, etc. - and have the participants practice these skills. AEA has offered short term workshops for high school students and as part of their training, the students assist community Elders by winterizing their homes. The students earn school credit for their work and the Elders' homes are winterized.

Home Maintenance Workshops have a similar goal – to provide basic knowledge and skills to maintain a home in good condition and identify ways to increase energy efficiency. This could include cleaning and/or replacing furnace filters, lightbulbs, caulking, etc. and learning about ways to increase energy efficiency.

4. **Switch all washers and fridges to Energy Star and switch all lights to LED in homes** (New strategy)**.**

There have been very few EEIP rebates given for Energy Star washing machines and refrigerators in Aklavik in the past year and the assumption is that few of the appliances in town are actually Energy Star. By purchasing Energy Star appliances, people save money year after year and have lower electricity, water and pump-out bills. Energy Star washing machines allow clothes to be dried more quickly as a front loading washer removes more water in the spin cycle.

Light Emitting Diodes (LEDs) use up to 80% less energy than incandescent bulbs, last longer than CFLs and incandescent bulbs, and LEDs have no mercury, and work well when it is cold.

Aklavik could be the first community to be completely Energy Star and LED in their residences. Thought would need to be taken as to whether this program would be applied to all private homeowners, some private home owners or all houses in Aklavik (including NWTHC).

5. **Install wood stoves in homes** (New strategy).

There is significant interest in having wood stoves installed in Aklavik. Aklavik and AEA conducted a wood stove project in 2010. Another, similar project could be initiated for homeowners who were not able to take advantage of it the first time. These projects are typically done in a partnership and depending on what the community wishes to focus on, often includes local training components during install and certification of the wood stoves.

Suggestions for workshops included how to harvest, cut and season cord wood, and chimney-sweeping.

6. **Provide solar or solar/wind hybrid systems for bush camps** (New strategy)**.**

Train one (or more) community members to order and install small solar or solar/wind hybrid systems at the bush camps of residents of Aklavik. Installing these systems could reduce generator use in several people's camps.

7. **Increase local food availability and knowledge** (New strategy)**.**

Increase local food growing and harvesting in the community. Potentially have a greenhouse next to the power plant to capture waste heat from the generator and to use it to heat the greenhouse.

Partnering with organizations hosting gardening workshops and food collection workshops with Elders to increase local food harvesting could form part of this strategy.

Points to integrate as much as possible into all strategies

- **Educational component** – encourage involvement and participation from students at Moose Kerr School (2009 CEP strategy).

- **Incorporate skills and economic development opportunities** – training in clean energy technology (2009 CEP strategy).

Potential Future Strategies

1. **Include energy use considerations in all community planning exercises** (2009 CEP strategy).

It was deemed by council that this is occurring and should continue to occur.

From the 2009 CEP: "Energy use is affected by each decision made by the individuals or the community in Aklavik. Areas in which the Hamlet and the Council are lead decision-makers - such as land-use plans, and purchasing - can have a significant impact on energy use both in the short term and in the long term. Evaluating the potential impact of decisions on energy use and energy costs can help the Hamlet realize its vision."

To accomplish this action, the Hamlet will need to formalize a process where consideration of both immediate and long term impacts on energy use and energy costs are considered in the decision-making processes.

2. **Implement an energy efficient building standard for new homes** (2009 CEP strategy).

From the original plan:
New homes are designed to last for many years - and the best and most cost effective time to improve energy efficiency of the building is during the design and building phase.

There are many building design standards and codes that are used across Canada to certify the improved energy performance of a building. EnerGuide for Homes is a standardized tool used for measuring performance.

Buildings that achieve between 80 and 90 on the EnerGuide rating system are considered very efficient (by comparison, most building standards result in an EnerGuide score of between 68 and 72. A score of 80 means the building would use about 25% less energy compared to a new building that receives 68-72).

Some municipalities, like the City of Yellowknife are requiring that all new homes in their jurisdiction be built to EnerGuide 80 because the added cost of more efficient buildings is minimal, and the energy savings are significant.

The challenge for a smaller community is that limited resources make it uncertain how to effectively follow through on this action and how to enforce the standard once in place.

3. **Implement an energy efficient building standard for new non-residential buildings** (2009 CEP strategy).

Demanding energy efficiency terms in an RFP will ensure that quotes are given for high efficiency buildings. This means that the building will cost a lot less to operate (heat, light, etc) and will produce less greenhouse gas emissions. Although the building may have a slightly higher initial cost, the reduced operating cost will more than compensate for that if the

building is well designed (from AEA's Energy Efficiency in Request for Proposals for New Buildings Guide (http://aea.nt.ca/research/research-4)

Similar to #2, the challenge for a smaller community is that limited resources make it uncertain how to effectively follow through on this action and how to enforce the standard once in place.

4. **Work with stores to improve the selection of EnergyStar appliances and LED lights available to community residents** (New strategy).

This project would involve working with the Northern and Stanton's to have EnergyStar appliances available and to help get a larger variety of LED bulbs into both stores. There is currently an LED point of sale rebate available on LED bulbs at the Northern.

This project could also result in mandating that only EnergyStar appliances and LED bulbs be sold in Aklavik.

5. **Conduct a wood pellet/wood chip boiler feasibility study** (New strategy, but based on "Exploration of alternative energy development (wind, solar, hydro electricity)" from 2009 CEP strategy)

There are a number of NWT communities where wood pellet boilers are used to heat buildings or a group of buildings in a district heating set-up. We should look at the lessons learned from other NWT biomass systems and monitor their progress to deem feasibility for Aklavik.

6. **Conduct a wind potential study** (New strategy, but based on "Exploration of alternative energy development (wind, solar, hydro electricity)" from 2009 CEP strategy)

There haven't been any formal wind studies done in Aklavik but based on a report titled "Assessing the potential uptake for a remote community wind incentive program in Canada", by Tim Weis and John Maissan, published in 2007, the wind potential in Aklavik is "fair".

However, this data is not from actual site data and there could potentially be some very good sites that community members know about that have much better potential. Fred Behrens has been talking with wind expert J.P. Pinard out of Whitehorse who has conducted many wind potential studies in the NWT.

7. **Conduct a micro-hydro potential study** (New strategy, but based on "Exploration of alternative energy development (wind, solar, hydro electricity)" from 2009 CEP strategy)

It was suggested that a feasibility study be undertaken to look at the potential of a micro-hydro in the Peel channel of the Mackenzie Delta, right beside the community. Some studies and tests have been done in Whati, Lutsel K'e, Deline and Fort Simpson and the findings from these potential projects should be collected and summarized.

The GNWT advises that "Hydro projects can take over 10 years to develop and require a substantial amount of upfront, at-risk investment. Undertaking baseline monitoring, environmental and engineering work can shorten the development timeframe and position northern governments to take advantage of hydro development opportunities as they emerge. This work is also linked with the NWT Water Stewardship Strategy. Gaining a greater understanding of NWT rivers supports both the conservation and development objectives of northern governments. " (from http://www.pws.gov.nt.ca/sites/www.pws.gov.nt.ca/files/hydro_resources_0.pdf)"

NTPC assessed some hydro options and summarized whether certain technologies were "proven Northern application" or a "emerging potential" (https://www.ntpc.com/smart-energy/green-energy).

Strategies removed from original plan – Completed or not feasible

1. **Waste heat capture from the diesel generating facility** (2009 CEP strategy)

This was examined but deemed not feasible due to the distance of the power plant to the closest buildings. When energy prices change, it may be worthwhile looking at this again.

2. **Install solar water heaters on one or more community buildings** (2009 CEP strategy)

A solar hot water heater was installed on the swimming pool. There are no other buildings in town with high hot water loads that are running off of one central hot water system and thus it was deemed that this isn't worth pursuing further at this time.

3. **Use of alternative energy for buildings** (2009 CEP strategy)

Solar electricity systems have been installed on 3 buildings in town - on the recreation complex; the SAO's residence; and the Bed & Breakfast. With the additional 55kW solar farm being installed by NTPC in March 2017, the maximum allowable capacity for grid-connected microgeneration in Aklavik has been met. Without discussions to change the allowable capacity available for microgeneration, no additional capacity can be added to the electricity grid.

Next steps

Now that a list of strategies has been identified, the next step is to develop an implementation plan for each strategy. An implementation plan describes how each strategy will be carried out.

It is helpful to keep track of what happens to see how well things work.

The following questions can be asked:

- Did we complete all our projects?
- How do we know the projects are done?
- What things went well as we did our work?
- What things do we need to change in the future?

When the energy plan is complete, the cycle starts again. A new community energy profile can be created and new projects can be identified. The learning from one cycle is applied to the next.

Funding

NRCAN funding

NRCan has provided funding to make the review of the Aklavik CEP possible, and has also committed to providing some funding in the 2017/18 fiscal year to help support the implementation of some of the strategies. In 2017/18 NRCAN will fund conservation and efficiency projects.

There is also other funding available that some of the other projects could fall under. See Appendix for the list of strategies table and which funding they may be eligible for.

Energy Efficiency Incentive Program

The Energy Efficiency Incentive Program (EEIP) was designed to provide rebates to homeowners and consumers who purchase new, more energy efficient models of products that they use every day. Buying energy efficient products will help you save energy costs while reducing greenhouse gas emissions.

Alternative Energy Technologies Program

This program provides funding for renewable energy sources such as solar, wind, wood pellet heating, biofuel/synthetic gas and ground source heat pumps. This funding is available to communities, commercial businesses and NWT residents.

Community Government Building Energy Retrofit Program

This Program supports upgrades to Community Government-owned buildings which will reduce their use of electrical/heat energy and water. The Arctic Energy Alliance (AEA) staff can help you get a handle on your building's current energy use and figuring out the best savings, and the cost of upgrades and materials to get

those savings. Community Governments can also hire AEA to manage the implementation of energy upgrades for a fee.

Commercial Energy Conservation and Efficiency Program

Arctic Energy Alliance (AEA) has energy experts and money available to help your businesses conserve energy and improve its energy efficiency. If you own a business and are interested in saving money by reducing the amount of heating fuel, electricity and water used, or want to reduce your greenhouse gas emissions, this program is for you.

POLAR Knowledge funding

Northern Science & Technology and Polar Knowledge Application programs

POLAR's Northern Science and Technology Program encompass four strategic priorities. These include:

1. Baseline information to prepare for northern sustainability
2. Predicting the impacts of changing ice, permafrost, and snow on shipping, infrastructure, and communities
3. Alternative and renewable energy for the North
4. Catalyzing improved design, construction and maintenance of northern built infrastructure

Polar Knowledge Application program: aims to promote and further strengthen polar science and technology nationally and internationally and build science capacity through training, outreach, increased knowledge sharing and learning opportunities.

The program aims to enhance and build awareness of the polar regions across Canada through fostering collaborations with other organizations to promote Canadian northern science and technology and advance the next generation of researchers and highly qualified personnel.

Key words

We encourage you to understand and learn to use some key words about energy planning.

Capacity

Capacity is the knowledge, skills, people power, time, energy, money, and other resources that a person, group, or community has. We can increase capacity any time we increase any of these resources.

$CO_{2\ EQ}$ - Carbon dioxide equivalent

$CO_{2\ EQ}$ measures greenhouse gas emissions. Carbon dioxide is the most common greenhouse gas and we use it to show overall greenhouse gas emissions.

We measure greenhouse gas emissions as Tonnes $CO_{2\ EQ.}$

One Tonne = 1000 kilograms.

Cogeneration

Cogeneration is a system and technology that takes waste heat from a diesel generator and pipes it to a nearby building, to heat that building.

Community energy plan

A community energy plan shows how a community changes how they use energy today, to meet their vision of how they want to use energy more wisely in the future. It shows the process and information the community uses to decide what they want to do, how they want to do it, and who will do the work.

Energy audit

An energy audit measures how a building uses energy and what you can change in the building, to save energy.

Energy efficiency

Energy efficiency means to use less energy and still do the same amount of work. An energy efficient vehicle uses less gas to go the same distance. An energy efficient refrigerator uses less electricity to keep things cold. Energy efficient habits are things people do that use less energy – such as turning off lights when you don't use them, walking instead of driving, using a clothesline instead of a dryer.

Demonstration project

A demonstration project is something we decide to do once, to show that it works. For example, to do a demonstration project for solar water heating we could install a system in a building like the nursing station. We'd keep track of things like how much money we save over one year, compared with when we didn't have the solar water heating system.

Feasibility / Pre-feasibility study

A feasibility study is when we learn things to find out if something is possible. For example, to do a feasibility study for a run-of-river hydro project, we'd pick one or more sites we think might be good. We'd measure things such as water flow and the height of a waterfall over a year or more.

A pre-feasibility study is when we learn things to help decide if we want to do a feasibility study. In the example above, we'd learn general things about run-of-river hydro and we'd decide which sites might be good to look at more closely.

Fossil fuels

Fossil fuels include things like gasoline, diesel oil, and natural gas. Fossil fuels come from deep in the ground and they are a nonrenewable resource. Once we use them up, they are all gone.

Greenhouse gases and climate change

Greenhouse gases are part of the earth's atmosphere - gases such as carbon dioxide, methane, nitrous oxide, and others. Sunlight comes through the atmosphere and hits the earth's surface. Some light energy bounces back into the atmosphere as heat energy. Greenhouse gases trap the heat and keep it in the atmosphere.

Many greenhouse gases come from nature. Human activity also creates lots of greenhouse gases – especially burning fossil fuels.

Over time, the earth's temperature should stay about the same if amount of energy coming in from the sun is the same as the energy going back into space. Right now we burn too much fossil fuels and produce much greenhouse gases – we've upset the balance. This causes climate change.

Microgeneration

Microgeneration is small-scale generation of electricity (or heat) by someone other than the utility to supplement the traditional grid-connected power.

Renewable energy

Renewable energy is energy that comes from things that can last forever. Renewable energy is never all gone. Examples of renewable energy sources include the sun, wind, moving water, and wood.

Appendix - Community Survey Results

What do you currently do to conserve energy?

- Unplug things / shut off lights / unplug appliances – 29
- Lower thermostat when not in house - 8
- Energy efficient appliances - 4
- LED light bulbs – 5
- Fast showers, less water - 2
- Wood stoves - 3
- Walk – 4
- Weatherization – 2
- Installed water filter to stop buying bottled water -2
- Harvests from the land , eat local food – 2
- Daylighting- Open the curtains during the day – 3
- Hang clothes to dry
- Put on extra clothes

What would you like to see the community do to reduce energy costs?

Conservation / Efficiency (27)

- Use LED in houses, street lights
- weatherize your home, add more insulation
- more energy efficient appliances
- turn off lights and appliances
- turn off water when not using it
- improve efficiency in homes and building
- turn down the siren
- bank the snow
- warm up shack to encourage people to walk
- turn off water
- improve Joe Greenland center
- Implement energy efficiency for new buildings into plans
- Make sure new school is efficient

Renewable - 16

- solar panels - 13
- bring in wind power; install wind generation as private business - 4
- more woodstove products, and stove installs
- find new methods of energy - research other countries
- geothermal

Support / Incentives - 5

- more subsidies – renewable and energy efficient products
- Support homeowners with energy efficiency projects

Education - 6

- educate more on conserving energy
- have winterization workshops
- training for renewable energy installs
- training for wood harvesting

Local food - 2

- Build the greenhouse

What could your role be in energy conservation/efficiency while respecting your traditional values?

Conserve (12)

- using less energy; less electronics; less power, be more active, never waste, be wise with energy usage, preserve for future use
- recycle/salvage
- Turn everything at school off especially on Fridays

Educate people (6)

- teach children while they are young not to waste anything and be more energy wise (3)
- Help with seeds and soil education (1)
- Storytelling from elders to youth
- Coordinate a youth energy contest

Alternative Energy (8)

- biomass, wind power
- more woodstove products, and stove installs

- **Be more involved / more active** (2)

Efficiency

- buy energy efficient machines/skidoos/boat motor for hunting
- pull out the oil lamps to save on energy

Maintain environmental stewardship ideals (5)

- preserve and care of land
- use the land properly to produce energy

Local food

- harvest traditional food
- outdoor freezer
- organise greenhouse

Do you have energy star appliances and LED lights?

Yes – 30

- LED lights – 24
- Washer - 12
- Fridge - 12
- Dryer – 3
- CFL lights - 3
- Stove - 2
- TV - 3

Would you attend any sessions or meetings that offered more information on energy conservation or efficiency?

- Yes if I have time/not working – 15
- Yes – 11
- No – 6

Appendix - Updated List of Recommended Strategies in our Community Energy Plan	NRCan funding	Capital cost estimate	Savings estimate ($/year)	Savings (GHG tonne CO_2/year)	Payback	Other funding available?	Funding potential	Payback with funding
1. Complete a series of energy efficiency audits and retrofits for non-residential buildings in Aklavik (Original plan strategy).								
Community Government Buildings only	yes	$107,000	$50,000	64	2.1	Com. Gov't Retrofit	$35,000	1.4
2. Complete a series of homeowner energy evaluation and retrofits (New strategy).								
20 households	yes	$94,000	$15,500	37	6.1	ERS and EEIP	$28,000	4.3
All privately owned houses (~60 households)	yes	$282,000	$46,600	111	6.1	ERS and EEIP	$83,000	4.3
3. Provide winterization and home maintenance workshops (including training for students and help for elders) (New strategy).								
Workshop at school for students + materials for implementation of measures in 20 homes (elders +)	yes	$29,000	$2,200	4	13.2	No?	$0	13.2
4. Switch all washers and fridges to Energy Star and switch all lights to LED in homes (New strategy).								
Switch 20 households' fridges + washers (~20 households)	yes	$60,000	$4,600	10	13.1	EEIP	$12,000	10.5
Switch all private homeowners fridges + washers (~60 households)	yes	$180,000	$10,600	25	17.0	EEIP	$36,000	13.6
Switch all private homeowners to 100% LED lighting (~60 households)	yes	$13,000	$6,900	22	1.9	EEIP	$6,400	0.9
5. Install wood stoves in homes (New strategy).								
Purchase and installation in 20 households	no	$120,000	$31,000	86	3.9	EEIP	$15,000	3.4
6. Provide solar or solar/wind hybrid systems for bush camps (New strategy) & training.								
Small solar set-up at 5 camps + training of 1 person	no	$69,000	$2,100	3	33.0	AETP + ASETS	$27,000	20.1
7. Increase local food availability and knowledge (New strategy). Greenhouse, use waste heat from NTPC generator, workshops, etc.	no	?	?	?		ITI		

*Note that these calculations are rough estimates based on class D estimating, at best +/- 40% . Once more information is available, these estimates can be narrowed down.